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To further verify the fact, he frightened the chipmunk, and brought home the half eaten young mouse, which I examined, and found to be of the species above mentioned.

Writers on our natural history have much to condemn in the carnivorous propensities of the red squirrel (*Sciurus Hudsonius* Pallas), of the flying squirrel (*Sciuropterus volucella*, (Pall) Geoff), the rats and shrews, but the chipmunk escapes without vituperation.

Speaking of the food of the striped squirrel, Audubon says, in 'Quadrupeds of North America,' "it prefers wheat to rye, seems fond of buckwheat, but gives preference to nuts, cherry-stones, the seeds of the red gum or pepperidge (*Nyssa multiflora*), and those of several annual plants and grasses." He mentions the case, reported to him by a Boston lady, of a ground squirrel which was seen taking young robins from the nest. This, he thinks, was an "unnatural propensity in the individual," and did not indicate "the genuine habit of the species."

Dr. C. Hart Merriam, in his 'Vertebrates of the Adirondack region,' says "the striped squirrel feeds upon a variety of nuts and roots, and is fond of corn and several kinds of grain." It is especially fond of beech nuts, and stores up the seeds of various plants, as of the buttercup; eats the tubers of the ground nut (*Aralia trifolia*), and the yellow 'kernels' of squirrel-corn (*Dicentra Canadensis*). He quotes from a writer in the *American naturalist*, who saw a chipmunk "busy nibbling at a snake that had been recently killed. He could hardly be driven away, and soon returned to his feast when his tormenters had withdrawn a short distance."

It is commonly known that the red squirrel is carnivorous to the extent of eating cocoons of insects in the spring, devouring bird-eggs, and even taking the young birds from the nest; and it is quite possible that the chipmunk, which is rarely seen in trees, may become emboldened to treat the smaller ground-building birds in a similar fashion. The wholesale destruction of birds, which is often rightly attributed to the red squirrel, may be shared in to some extent, at least, by the no less active *Tamias*.

F. H. HERRICK.

Recent Proceedings of Societies.

Academy of natural sciences, Philadelphia

Oct. 6.—Mr. Charles Morris made a communication on the subject of attack and defence, as determining agents in animal evolution. In considering the development of the dermal skeleton of animals, with its various modifications, we are led almost to the conception that nature has been controlled at successive periods by special ideas, each dominant during a long period and then abandoned in favor of a new one. We are quite sure that the first appearance of fossils in the rocks does not indicate the first appearance of life upon the earth. Early fossilization is due to the preservation of the dermal skeletons of animals of considerably advanced organization, and these were very probably preceded, during a long era, by soft-bodied forms of low organization, which could leave no trace of their existence, except in the case of the burrowing worms. The development of an external skeleton seems to have come like a new idea to nature, and was adopted simultaneously, as it seems, though probably at considerable intervals by the

various types of life. At a later era, the prevailing tendency is not to assume armor but to throw it off. The labyrinthodont amphibians were clothed in armor, their heads in particular being protected by hard, bony plates. Modern amphibians are naked-skinned animals. The reptiles are usually scaled, but with the exception of the crocodiles and turtles and some few fossil types, they do not seem to have been clothed in bony armor, while in the birds and mammals all defensive armor is lost. The same tendency to pass from the armored to the unarmored state is seen in invertebrate life. These changes were held to have taken place in consequence of the reciprocal influence of attack and defence. If a food animal gained some structural feature which gave it an advantage over its carnivorous foes, the latter would be at a disadvantage until they had gained equivalent features. So, if a carnivorous animal gained some habit, motion, or weapon, which gave it an advantage in destroying, this must have acted as an incitement to a corresponding development in food animals. Illustrative facts were freely given to support the belief that four successive ideas emerge into prominence in the development of the animal kingdom. In the primeval epoch it is probable that only soft-bodied animals existed, and the weapons of assault were the tentacle, the thread cell, the sucking disk, and the like unindurated weapons. At a later period, armor became generally adopted for defence, and the tooth became the most efficient weapon of attack. Still later, armor was discarded, and flight or concealment became the main methods of escape, and swift pursuit the principle of attack, while claws were added to teeth as assaulting weapons. Finally, mentality came into play, intelligence became the most efficient agent both in attack and defence, and a special development of the mind began. As a culmination of the whole, we have man, in whom mentality has replaced all other agents in the struggle for existence. But side by side with man all the other types exist, the soft-bodied, the armored, the swift moving, and those in which cunning precedes the higher mentality. In the existing conditions of life on the earth, we have an epitome of the whole long course of evolution. Prof. Heilprin, while agreeing in the main with Mr. Morris's arguments and deductions, remarked the occurrence of certain conditions among early organic forms, which, from the position defined, would be anomalous. The Cambrian trilobites, the largest organisms apparently of their time, were already clad in very perfect armor. Was this the result of evolution without the necessity for defence? The most highly armored ganoid fishes are those of the shortest period of existence. The huge carboniferous amphibians are cased in armor, without the existence of contemporaries at all powerful enough to inflict damage on them; while at the present time the unprotected ant eater lives side by side with such armored forms as the armadillo.—Mr. Redfield called attention to the fact that in the vicinity of Mt. Desert the traces of glacial action were very obscure, and stated that this had been accounted for by the theory that the region had been submerged for a sufficient length of time to remove the striae from the softer rock. On the hard quartz veins the scoring was evident, while farther inland the slates and softer deposits bore clear traces of glacial scratching. The subject was further considered by Mr. Aubrey H. Smith and Prof. Heilprin, the latter holding that the geologists were apt to

push the theory of submergence too far in accounting for such phenomena.

Calendar of Societies.

Boston society of natural history.

Oct. 7.—Dr. S. Kneeland, The family-life of the Norwegian Lapps, and the habits of the reindeer.

Society of Arts, Boston.

Oct. 8.—Prof. W. T. Sedgwick, The relative poisonous properties of (illuminating) coal and water-gas.

Cambridge entomological club.

Oct. 9.—George Dimmock, An account of his mode of rearing larvae of Coccinellidae.

American academy of arts and sciences, Boston.

Oct. 9.—Mr. Seth C. Chandler, Jr., On the square bar micrometer.—Prof. Arthur Searle, On the apparent position of the zodiacal light.—Messrs. Chas. R. Cross and James Page, The measurement of the strength of telephone currents.—Prof. Charles R. Cross, The thermal telephone.

Publications received at Editor's Office, Oct. 5-10.

Allgemeine naturkunde. Das leben der erde und ihrer geshöpfe. Heft i. Leipzig, *Bibliogr. inst.*, 1885. 80 p., illustr. (New York, Stechert.)

Billings, J. S. Report on the mortality and vital statistics of the United States. Part i. Washington, *Government*, 1885. 64+67 p., illustr., 2 pl. 4°.

Candolle, A. de. Histoire des sciences et des savants depuis deux siècles Genève-Bale, *Georg*, 1885. 16+594 p. 8°. (New York, Christern, §3.)

Dammer, O. Illustrirtes lexikon der verfälschungen und verunreinigungen der nahrungs- und genussmittel der kolonial-waren, u.s.w. Leipzig, *Weber*, 1885. 160 p., illustr. 8°. (New York, Stechert.)

Denifle, P. H. Die universitäten des mittelalters bis 1400. Band i. Berlin, *Weidmann*, 1885. 48+815 p. 8°. (New York, Christern, §8.80.)

Deutscher fischerei-verein. Mittheilungen der section für küsten- und hochseefischerei. No. i, June, 1885. (Berlin, *Moeser*, 1885. m. 20 p. 8°.)

Donnat, L. La politique expérimentale. Paris, *Reinwald*, 1885. (Bibl. sc. contemp.) 8+488 p. 12°. (New York, Christern, §1.75.)

Engelhardt, L. v. Ferdinand von Wrangel und seine reise längs der nordküste von Sibirien und auf dem eismere. Leipzig, *Duncker & Humblot*, 1885. 14+212 p., portr., map. 8°. (New York, Christern, §1.85.)

Fall, D. Syllabus of the instruction in biology, with references to sources of information, at Albion college. Albion, Mich., *Recorder st. pr.*, 1885. 24 p. 12°.

Gilson, G. and Carnoy, J. B. La cellule; recueil de cytologie et d'histologie générale. Tome i. Etudes sur les arthropodes. I. Etude comparée de la spermatogénèse chez les arthropodes; II. La cytotidie chez les arthropodes. Lierre, *Van In*, 1885. 188 p., 8 pl. 4°. (New York, Christern, §5.50.)

Gouguenheim, A. and Lermoyez, M. Physiologie de la voix et du chant. Paris, *Delahaye & Lecrosnier*, 1885. 208 p. 12°. (New York, Christern, §1.)

Guggenheim, M. Die lehre von apriorischen wissen in ihrer bedeutung für die entwicklung der ethik und erkenntniss-theorie in der Sokratisch-Platonischen philosophie. Berlin, *Dümmler*, 1885. 79 p. 8°. (New York, Christern, 75 cents.)

Guyot, Y. Lettres sur la politique coloniale. Paris, *Reinwald*, 1885. 18+432 p., 2 pl., map. 12°. (New York, Christern, §1.25.)

Hartmann, E. v. Philosophische fragen der gegenwart. Leipzig, *Friedrich*, 1885. 8+298 p. 8°. (New York, Stechert.)

Holzapfel, L. Römische chronologie. Leipzig, *Taubner*, 1885. 6+364 p. 8°. (New York, Christern, §2.20.)

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Lindstrom, G. List of the fossils of the Upper Silurian formation of Gotland. Stockholm, *Norstedt*, 1885. 20 p. 8°.

Philippon, G. Cours de zoologie; l'homme et les animaux. Paris, *Doin*, 1885. 481 p., illustr. 12°. (New York, Christern, §1.50.)

Pickering, W. H. Photography of the infra-red region of the solar spectrum. Boston, *Amer. acad. arts and sc.*, 1885. [5] p., illustr. 8°.

— Methods of determining the speed of photographic expositors. Cambridge, *Wilson, pr.*, 1885. [5] p. 8°.

— Principles involved in the construction of photographic expositors. Cambridge, *Wilson, pr.*, 1885. [9] p., illustr., 2 pl. 8°.

Prei, C. du. Die philosophie der mystik. Leipzig, *Günther*, 1885. 12+548 p. 8°. (New York, Christern, §3.70.)

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Richter, K. Die botanische systematik und ihr verhältniss zur anatomie und physiologie der pflanzen. Wien, *Faes*, 1885. 4+172 p. 8°. (New York, Stechert.)

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